IN THE CLAIMS:

1.-3. (withdrawn) A method comprising:

estimating a length of a refractory period of a heart; and

setting a parameter for delivery of extra-systolic stimulation to the heart based on the estimated length.

2. (withdrawn) The method of claim 1, wherein setting a parameter for delivery of extra-systolic stimulation comprises setting an extra-systolic interval.

3. (withdrawn) The method of claim 2, wherein setting the extra-systolic interval based on the estimated length comprises adding an amount of time to the estimated length.

4. (canceled)

5. (currently amended) The method of claim 7~~4~~, wherein determining whether the probe pulse captured the heart comprises:

monitoring electrical activity within the heart; and

detecting whether delivery of the probe pulse resulted in an evoked response.

6. (currently amended) The method of claim 7~~4~~, wherein determining whether the probe pulse captured the heart comprises:

monitoring an intracardiac pressure; and

determining whether the probe pulse captured the heart based on a rate of change of the intracardiac pressure subsequent to delivery of the probe pulse.

7. (currently amended) ~~The method of claim 4,~~ A method comprising:

estimating a length of a refractory period of a heart; and

setting a parameter for delivery of extra-systolic stimulation to the heart based on the estimated length of the refractory period of the heart, wherein estimating the length of the refractory period comprises:

detecting a systolic depolarization of the heart;

delivering a probe pulse to the heart an interval after detection of the systolic depolarization that is less than an extra-systolic interval;

determining whether the probe pulse captured the heart; and

estimating the length of the refractory period based on the determination,

wherein delivering a probe pulse comprises delivering a probe pulse every N cardiac cycles, N being an integer greater than one, the method further comprising delivering an extra-systolic pulse at the expiration of the extra-systolic interval after detection of a systolic depolarization of the heart during cardiac cycles in which a probe pulse is not delivered.

8. (currently amended) ~~The method of claim 4,~~ A method comprising:

estimating a length of a refractory period of a heart; and

setting a parameter for delivery of extra-systolic stimulation to the heart based on the estimated length of the refractory period of the heart, wherein estimating the length of the refractory period comprises:

detecting a systolic depolarization of the heart;

delivering a probe pulse to the heart an interval after detection of the systolic depolarization that is less than an extra-systolic interval;

determining whether the probe pulse captured the heart; and

estimating the length of the refractory period based on the determination,

wherein delivering a probe pulse comprises:

delivering a first probe pulse a first interval after detection of a first systolic depolarization of a first cardiac cycle;

delivering a second probe pulse a second interval after detection of a second systolic depolarization of a second cardiac cycle; and

determining that the first probe pulse captured the heart and the second probe pulse did not capture the heart, and

wherein estimating the length of the refractory period comprises estimating the length of the refractory period as a value between the first and second intervals.

9. (currently amended) The method of claim 7~~4~~, further comprising:

determining that the probe pulse captured the heart; and

decreasing the interval for delivery of a subsequent probe pulse.

10. (original) The method of claim 9, further comprising:

determining that the subsequently delivered probe pulse captured the heart; and delivering a probe pulse every cardiac cycle until one of the delivered probe pulses does not capture the heart in response to the determination, each probe pulse delivered an interval after detection of a systolic depolarization of the heart that is less than a previous probe pulse.

11. (currently amended) The method of claim 7~~4~~, further comprising:

determining that the probe pulse did not capture the heart; and

increasing the interval for delivery of a subsequent probe pulse.

12. (original) The method of claim 11, further comprising:

determining that the subsequently delivered probe pulse did not capture the heart; and delivering a probe pulse every cardiac cycle until one of the delivered probe pulses captures the heart in response to the determination, each probe pulse delivered an interval after detection of a systolic depolarization of the heart that is greater than a previous probe pulse.

13. (withdrawn) A medical device comprising:

electrodes; and

a processor to control delivery of extra-systolic stimulation to a heart of a patient via the electrodes as a function of a parameter, wherein the processor estimates a length of a refractory period of the heart, and sets a value for the parameter based on the estimated length.

14. (withdrawn) The medical device of claim 13, wherein the parameter is an extra-systolic interval.

15. (withdrawn) The medical device of claim 14, wherein the processor sets the value for the extra-systolic interval by adding an amount of time to the estimated length of the refractory period.

16. (canceled)

17. (currently amended) The medical device of claim 19~~16~~, wherein the processor monitors electrical activity within the heart via the electrodes, determines whether delivery of the probe pulse resulted in an evoked response based on the electrical activity to determine whether the probe pulse captured the heart.

18. (currently amended) The medical device of claim 19~~16~~, further comprising a pressure sensor, wherein the processor monitors an intracardiac pressure via the pressure sensor, and determines whether the probe pulse captured the heart based on a rate of change of the intracardiac pressure subsequent to delivery of the probe pulse.

19. (currently amended) ~~The medical device of claim 16,~~ A medical device comprising:

electrodes; and

a processor to control delivery of extra-systolic stimulation to a heart of a patient via the electrodes as a function of a parameter, wherein the processor estimates a length of a refractory period of the heart, and sets a value for the parameter based on the estimated length of the refractory period of the heart, wherein the processor detects a systolic depolarization of the heart via the electrodes, controls delivery of a probe pulse to the heart an interval after detection of the systolic depolarization that is less than an extra-systolic interval, determines whether the probe pulse captured the heart, and estimates the length of the refractory period based on the determination, wherein the processor controls delivery of a probe pulse every N cardiac cycles, N being an integer greater than one, and controls delivery of an extra-systolic pulse, wherein the extra-systolic pulse is delivered at the expiration of the extra-systolic interval after detection of a systolic depolarization of the heart during cardiac cycles in which a probe pulse is not delivered.

20. (currently amended) The medical device of claim 19~~16~~, wherein the processor controls delivery of a first probe pulse a first interval after detection of a first systolic depolarization of a first cardiac cycle and a second probe pulse a second interval after a second systolic depolarization of a second cardiac cycle, determines that the first probe pulse captured the heart and the second probe pulse did not capture the heart, and estimates the length of the refractory period as a value between the first and second intervals.

21. (currently amended) The medical device of claim 19~~16~~, wherein the processor determines that the probe pulse captured the heart, and decreases the interval for delivery of a subsequent probe pulse.

22. (original) The medical device of claim 21, wherein the processor determines that the subsequently delivered probe pulse captured the heart, and controls delivery of a probe pulse every cardiac cycle until one of the delivered probe pulses does not capture the heart in response to the determination, each probe pulse delivered an interval after

detection of a systolic depolarization of the heart that is less than a previous probe pulse.

23. (currently amended) The medical device of claim 19~~16~~, wherein the processor determines that the probe pulse did not capture the heart, and increases the interval for delivery of a subsequent probe pulse.

24. (original) The medical device of claim 23, wherein the processor determines that the subsequently delivered probe pulse did not capture the heart, and controls delivery of a probe pulse every cardiac cycle until one of the delivered probe pulses captures the heart in response to the determination, each probe pulse delivered an interval after detection of a systolic depolarization of the heart that is greater than a previous probe pulse.

25. (withdrawn) The medical device of claim 13, wherein the medical device is implantable within the patient.

26. (withdrawn) The medical device of claim 13, wherein the medical device is a pacemaker.

27. (withdrawn) A computer-readable medium comprising instructions that cause a programmable processor to:

estimate a length of a refractory period of a heart; and

set a parameter for delivery of extra-systolic stimulation to the heart based on the estimated length.

28. (withdrawn) The computer-readable medium of claim 27, wherein the parameter comprises an extra-systolic interval.

29. (canceled)

30. (currently amended) ~~The computer-readable medium of claim 29,~~ A computer-readable medium comprising instructions that cause a programmable processor to:

estimate a length of a refractory period of a heart; and

set a parameter for delivery of extra-systolic stimulation to the heart based on the estimated length of the refractory period of the heart, wherein the instructions the instructions that cause a programmable processor to estimate the length of the refractory period comprise instructions that cause a programmable processor to:

detect a systolic depolarization of the heart;

control delivery of a probe pulse to the heart an interval after detection of the systolic depolarization that is less than an extra-systolic interval;

determine whether the probe pulse captured the heart; and

estimate the length of the refractory period based on the determination,

wherein the instructions that cause a programmable processor to control delivery of a probe pulses comprise instructions that cause a programmable processor to control delivery of a first probe pulse a first interval after detection of a first systolic depolarization of a first cardiac cycle and a second probe pulse a second interval after detection of a second systolic depolarization of a second cardiac cycle,

the medium further comprising instructions that cause a programmable processor to determine that the first probe pulse captured the heart and the second probe pulse did not capture the heart, and

wherein the instructions that cause a programmable processor to estimate the length of the refractory period comprise instructions that cause a programmable processor to estimate the length of the refractory period as a value between the first and second intervals.

31. (currently amended) The computer-readable medium of claim 30~~29~~, further comprising instructions that cause a programmable processor to:

determine that the probe pulse captured the heart; and

decrease the interval for delivery of a subsequent probe pulse.

32. (original) The computer-readable medium of claim 31, further comprising instructions that cause a programmable processor to:

determine that the subsequently delivered probe pulse captured the heart; and

control delivery of a probe pulse every cardiac cycle until one of the delivered probe pulses does not capture the heart in response to the determination, each probe pulse delivered an interval after detection of a systolic depolarization of the heart that is less than a previous probe pulse.

33. (currently amended) The computer-readable medium of claim 30~~29~~, further comprising instructions that cause a programmable processor to:

determine that the probe pulse did not capture the heart; and

increase the interval for delivery of a subsequent probe pulse.

34. (original) The computer-readable medium of claim 33, further comprising instructions that cause a programmable processor to:

determine that the subsequently delivered probe pulse did not capture the heart; and

control delivery of a probe pulse every cardiac cycle until one of the delivered probe pulses captures the heart in response to the determination, each probe pulse delivered an interval after detection of a systolic depolarization of the heart that is greater than a previous probe pulse.

35.-60. (canceled)

61. (original) ~~A method comprising:~~

~~measuring a delay between delivery of a pulse to a heart and detection of an evoked response resulting from delivery of the pulse; and~~

~~adjusting a parameter for delivery of extra-systolic stimulation to the heart based on the delay~~.

62. (original) The method of claim 61, ~~wherein adjusting a parameter comprises adjusting an extra-systolic interval~~.

63. (original) The method of claim 62, ~~wherein the pulse is a probe pulse, the method further comprising:~~

~~detecting a systolic depolarization of the heart; and~~

~~delivering the probe pulse an interval after detection of the systolic depolarization, the interval less than the extra-systolic interval~~.

64. (currently amended) ~~The method of claim 63,~~ A method comprising:

measuring a delay between delivery of a pulse to a heart and detection of an evoked response resulting from delivery of the pulse; and

adjusting a parameter for delivery of extra-systolic stimulation to the heart based on the delay,

wherein adjusting a parameter comprises adjusting an extra-systolic interval,

wherein the pulse is a probe pulse, and

wherein the method further comprises:

detecting a systolic depolarization of the heart; and

delivering the probe pulse an interval after detection of the systolic depolarization, the interval less than the extra-systolic interval,

wherein adjusting the extra-systolic interval comprises:

comparing the delay to a threshold value; and

adjusting the extra-systolic interval based on the comparison.

65. (currently amended) ~~The method of claim 63,~~ A method comprising:

measuring a delay between delivery of a pulse to a heart and detection of an evoked response resulting from delivery of the pulse; and

adjusting a parameter for delivery of extra-systolic stimulation to the heart based on the delay,

wherein adjusting a parameter comprises adjusting an extra-systolic interval, wherein the pulse is a probe pulse, and

wherein the method further comprises:

detecting a systolic depolarization of the heart; and

delivering the probe pulse an interval after detection of the systolic depolarization, the interval less than the extra-systolic interval,

wherein delivering the probe pulse comprises delivering a probe pulse every N cardiac cycles, N being an integer greater than one, the method further comprising delivering extra-systolic pulses the extra-systolic interval after detection of systolic depolarizations of the heart during cardiac cycles in which a probe pulse is not delivered.

66. (currently amended) ~~The method of claim 63,~~ A method comprising:

measuring a delay between delivery of a pulse to a heart and detection of an evoked response resulting from delivery of the pulse; and

adjusting a parameter for delivery of extra-systolic stimulation to the heart based on the delay,

wherein adjusting a parameter comprises adjusting an extra-systolic interval,

wherein the pulse is a probe pulse, and

wherein the method further comprises:

detecting a systolic depolarization of the heart; and

delivering the probe pulse an interval after detection of the systolic depolarization, the interval less than the extra-systolic interval,

wherein delivering the probe pulse comprises:

delivering a first probe pulse of a pair a first interval after detection of a systolic depolarization of a first cardiac cycle; and

delivering a second probe pulse of the pair a second interval after detection of a systolic depolarization of a second cardiac cycle,

wherein the second interval is greater than the first interval, and the first and second intervals are less than the extra-systolic interval,

wherein measuring a delay between delivery of the probe pulse and detection of the evoked response comprises measuring a first delay subsequent to delivery of the first probe pulse and a second delay subsequent to delivery of the second probe pulse, and

wherein adjusting the extra-systolic interval comprises adjusting the extra-systolic interval based on the first and second delays.

67. (original) The method of claim 66, wherein adjusting the extra-systolic interval comprises:

determining that the second delay is longer than the first delay; and

increasing the extra-systolic interval in response to the determination.

68. (original) The method of claim 66, wherein adjusting the extra-systolic interval comprises:

determining that the first and second delays are substantially equal; and

decreasing the extra-systolic interval in response to the determination.

69. (original) The method of claim 66, wherein adjusting the extra-systolic interval comprises:

determining that the first delay is greater than the second delay; and

maintaining the extra-systolic interval at a current value in response to the determination.

70. (currently amended) ~~A medical device comprising:~~

~~electrodes; and~~

~~a processor to control delivery of pulses and extra-systolic stimulation to a heart of a patient and detect evoked responses via the electrodes, wherein the processor measures a delay between delivery of a pulse to the heart and detection of an evoked response resulting from delivery of the pulse, and adjusts a parameter for delivery of extra-systolic stimulation to the heart based on the delay~~.

71. (currently amended) The medical device of claim 70~~, wherein the parameter comprises an extra-systolic interval~~.

72. (currently amended) The medical device of claim 71~~, wherein the pulse is a probe pulse, and the processor detects a systolic depolarization of the heart via the electrodes and controls delivery of the probe pulse to the heart an interval after detection of the systolic depolarization, the interval less than the extra-systolic interval~~.

73. (currently amended) ~~The medical device of claim 72,~~ A medical device comprising:

electrodes; and

a processor to control delivery of pulses and extra-systolic stimulation to a heart of a patient and detect evoked responses via the electrodes, wherein the processor measures a delay between delivery of a pulse to the heart and detection of an evoked response resulting from delivery of the pulse, and adjusts a parameter for delivery of extra-systolic stimulation to the heart based on the delay,

wherein the parameter comprises an extra-systolic interval,

wherein the pulse is a probe pulse, and the processor detects a systolic depolarization of the heart via the electrodes and controls delivery of the probe pulse to the heart an interval after detection of the systolic depolarization, the interval less than the extra-systolic interval,

wherein the processor compares the delay to a threshold value, and adjusts the extra-systolic interval based on the comparison.

74. (currently amended) ~~The medical device of claim 72,~~ A medical device comprising:

electrodes; and

a processor to control delivery of pulses and extra-systolic stimulation to a heart of a patient and detect evoked responses via the electrodes, wherein the processor measures a delay between delivery of a pulse to the heart and detection of an evoked response resulting from delivery of the pulse, and adjusts a parameter for delivery of extra-systolic stimulation to the heart based on the delay,

wherein the parameter comprises an extra-systolic interval,

wherein the pulse is a probe pulse, and the processor detects a systolic depolarization of the heart via the electrodes and controls delivery of the probe pulse to the heart an interval after detection of the systolic depolarization, the interval less than the extra-systolic interval,

wherein the processor controls delivery of a probe pulse every N cardiac cycles, N being an integer greater than one, and controls delivery of extra-systolic pulses, wherein the extra-systolic pulse is delivered at the expiration of the extra-systolic interval after detection of systolic depolarizations during cardiac cycles in which a probe pulse is not delivered.

75. (currently amended) ~~The medical device of claim 72,~~ A medical device comprising:

electrodes; and

a processor to control delivery of pulses and extra-systolic stimulation to a heart of a patient and detect evoked responses via the electrodes, wherein the processor measures a delay between delivery of a pulse to the heart and detection of an evoked response resulting from delivery of the pulse, and adjusts a parameter for delivery of extra-systolic stimulation to the heart based on the delay,

wherein the parameter comprises an extra-systolic interval,

wherein the pulse is a probe pulse, and the processor detects a systolic depolarization of the heart via the electrodes and controls delivery of the probe pulse to the heart an interval after detection of the systolic depolarization, the interval less than the extra-systolic interval,

wherein the processor controls delivery of a first probe pulse of a pair a first interval after detection of a systolic depolarization of a first cardiac cycle, and controls delivery of a second probe pulse of the pair a second interval after a systolic depolarization of a second cardiac cycle, wherein the second interval is greater than the first interval, and the first and second intervals are less than the extra-systolic interval, and

wherein the processor measures a first delay subsequent to delivery of the first probe pulse and a second delay subsequent to delivery of the second probe pulse, and adjusts the extra-systolic interval based on the first and second delays.

76. (original) The medical device of claim 75, wherein the processor determines that the second delay is longer than the first delay, and increases the extra-systolic interval in response to the determination.

77. (original) The medical device of claim 75, wherein the processor determines that the first and second delays are substantially equal, and decreases the extra-systolic interval in response to the determination.

78. (original) The medical device of claim 75, wherein the processor determines that the first delay is greater than the second delay, and maintains the extra-systolic interval at a current value in response to the determination.

79. (currently amended) The medical device of claim 74~~70~~, wherein the medical device is implantable within the patient.

80. (currently amended) The medical device of claim 74~~70~~, wherein the medical device is a pacemaker.

81.-83. (canceled)

84. (currently amended) The computer-readable medium of claim 85~~83~~, wherein the instructions that cause a programmable processor to adjust the extra-systolic interval comprise instructions that cause a programmable processor to:

compare the delay to a threshold value; and adjust the extra-systolic interval based on the comparison.

85. (currently amended) ~~The computer-readable medium of claim 83,~~ A computer-readable medium comprising instructions that cause a programmable processor to:

measure a delay between delivery of a pulse to a heart and detection of an evoked response resulting from delivery of the pulse; and

adjust a parameter for delivery of extra-systolic stimulation to the heart based on the delay,

wherein the pulse is a probe pulse, and wherein the medium further comprises instructions that cause a programmable processor to:

detect a systolic depolarization of the heart; and

control delivery of the probe pulse to the heart an interval after detection of the systolic depolarization, the interval less than the extra-systolic interval,

wherein the parameter comprises an extra-systolic interval, and

wherein the instructions that cause a programmable processor to control delivery of the probe pulse comprise instructions that cause a programmable processor to control delivery of a probe pulse every N cardiac cycles, N being an integer greater than one, the medium further comprising instructions that cause a programmable processor to control delivery of extra-systolic pulses at the expiration of the extra-systolic interval after detection of systolic depolarizations of the heart during cardiac cycles in which a probe pulse is not delivered.

86. (currently amended) The computer-readable medium of claim 85~~83~~,
wherein the instructions that cause a programmable processor to control delivery of the probe pulse comprise instructions that cause a programmable processor to:

control delivery of a first probe pulse of a pair a first interval after detection of a systolic depolarization of a first cardiac cycle; and

control delivery of a second probe pulse of the pair a second interval after a systolic depolarization of a second cardiac cycle, wherein the second interval is greater than the first interval, and the first and second intervals are less than the extra-systolic interval,

wherein the instructions that cause a programmable processor to measure a delay between delivery of the probe pulse and detection of the evoked response comprise instructions that cause a programmable processor to measure a first delay subsequent to delivery of the first probe pulse and a second delay subsequent to delivery of the second probe pulse, and

wherein the instructions that cause a programmable processor to adjust the extra-systolic interval comprise instructions that cause a programmable processor to adjust the extra-systolic interval based on the first and second delays.

87. (original) The computer-readable medium of claim 86, wherein the instructions that cause a programmable processor to adjust the extra-systolic interval comprise instructions that cause a programmable processor to:

determine that the second delay is longer than the first delay; and

increase the extra-systolic interval in response to the determination.

88. (original) The computer-readable medium of claim 86, wherein the instructions that cause a programmable processor to adjust the extra-systolic interval comprise instructions that cause a programmable processor to:

determine that the first and second delays are substantially equal; and

decrease the extra-systolic interval in response to the determination.

89. (original) The computer-readable medium of claim 86, wherein the instructions that cause a programmable processor to adjust the extra-systolic interval comprise instructions that cause a programmable processor to:

determine that the first delay is greater than the second delay; and

maintain the extra-systolic interval at a current value in response to the determination.

90.-120. (canceled)